

SHUL'MAN, A.R.; KANICHEVA, I.R.; BARZDO, B.F.

Energy spectrum of electrons after passing through thin free  
metallic films. Fiz. tver. tela 5 no.11:3318-3321 N '63.  
(MIRA 16:12)

1. Leningradskiy politekhnicheskii institut imeni Kalinina.

SHUL'MAN, A.R.; KANICHEVA, I.R.; BARZDO, B.F.

Distribution of energy losses of an electron beam along the depth  
in copper and aluminum. Fiz. tver. tela 5 no.11:3344-3346 N  
'63. (MIRA 16:12)

1. Leningradskiy politekhnicheskii institut imeni M.I.Kalinina.

NEMCHENOK, R.L.; SHUL'MAN, A.R.; GRISHIN, V.S.

Barium adsorption on a polycrystalline gold base layer. Fiz. tver.  
tela 5 no.12:3544-3548 D '63. (MIRA 17:2)

1. Politekhnikheskiy institut imeni M.I.Kalinina, Leningrad.

L 10815-63 EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2--AFFTC/ASD/ESD-3/  
 SSD--Pz-l/Pab-l--AT/IJP(C)  
 ACCESSION NR: AP3003723 8/0109/63/008/007/1222/1232

AUTHOR: Kirsanova, T. S.; Shul'man, A. R.

TITLE: Variations in work function of a BaO-W system during substrate heating

SOURCE: Radiotekhnika i elektronika, v. 8, no. 7, 1963, 1222-1232

TOPIC TAGS: barium oxide-tungsten system, tungsten substrate heating, barium oxide two-phase adsorption, tungsten, barium oxide

ABSTRACT: Variations in emission properties of BaO-W systems during substrate heating have been investigated. Tungsten strips (99.97% W, 0.023% Mo) on which BaO was deposited served as substrates. Platinum wire spirals (99.99% Pt) containing barium carbonate (transformed into barium oxide by heating) were used for depositing BaO on the substrates. Measurements were made in sealed devices at residual gas pressures of  $10^{-9}$  to  $2 \times 10^{-9}$  mm Hg by determining the contact potential difference. These measurements served to determine the dependence of the work function of the system on deposition and heating time. It was found that 1) the decrease in the work function of tungsten with a BaO layer depends on substrate temperature during deposition, and the more active emitting films

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L 10815-63

ACCESSION NR: AP3003723

are obtained when this temperature lies within 800 to 1200K; 2) at these substrate temperatures the BaO layer shows higher stability, with BaO evaporation becoming noticeable at 1300K as compared to 1000K for BaO deposited on a cold substrate; 3) when the layer thickness exceeds that of the single layer, BaO adsorption is of a two-phase nature on the loose faces of crystals but not on faces with close atom packing; and 4) the curve of work function dependence on the quantity of adsorbed barium shows a marked minimum in the case of two-phase adsorption. "The authors thank degree student A. V. Dement'yeva for her assistance in the measurements." Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 28May62

DATE ACQ: 02Aug63

ENCL: 00

SUB CODE: SD

NO REF SOV: 010

OTHER: 004

mcs/ul

Card 2/2

ACCESSION NR: AP4011768

S/0181/64/006/001/0282/0289

AUTHORS: Kirsanova, T. S.; Shul'man, A. R.

TITLE: The nature of the dependence of the work function in the system barium oxide plus metal on the degree of surface covering

SOURCE: Fizika tverdogo tela, v. 6, no. 1, 1964, 282-289

TOPIC TAGS: work function, barium oxide, barium oxide plus metal, molybdenum, tungsten, surface covering, activated adsorption, nonactivated adsorption, adsorption

ABSTRACT: This is a continuation of work done by these authors, partly in cooperation with others, on this same general problem. It has been shown previously that the nature of the curve for  $\Phi = \Phi(\theta)$ , where  $\Phi$  = work function and  $\theta$  = degree of surface coverage is affected by the adsorption of BaO molecules in both phases of adsorption (nonactivated and activated). In the case of W, it was not possible to observe surface coverage of both phases because they overlap the temperature range in which active adsorption and evaporation occur. Therefore, to obtain a proper picture of the dependence of  $\Phi = \Phi(\theta)$  on the complete quantity of adsorbed BaO molecules, it proved of value to investigate the system BaO-Mo. With

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ACCESSION NR: AP4011768

Mo, evaporation of the BaO molecule takes place at temperatures approximately  $200^{\circ}$  higher than for W at the same degree of surface coverage. The authors show that low-temperature activation of thin BaO films is not associated completely with restoration of the BaO material on the substrate. The nature of the curve of  $\Phi = \Phi(\theta)$  on the system BaO-metal is determined by the conditions under which the film is sputtered on: the temperature of preheating and the crystalline structure of the substrate. As a consequence of activated adsorption there occurs an increase in concentration of BaO molecules in the monomolecular surface cover, and this leads to a decrease in the work function of the monomolecular system and, consequently, to a change in the nature of the curve. If, in the temperature range where activation is observed, multilayered adsorption is possible, or if the entire surface of the crystal is covered (in the case of BaO-Mo), then the curve of  $\Phi = \Phi(\theta)$  shows a well-defined minimum. "The authors express their thanks to the students A. I. Solov'yeva and Ye. S. Ovchinnikova, who participated in making the measurements." Orig. art. has: 3 figures.

ASSOCIATION: Polytekhnicheskiy institut im. M. I. Kalinina, Leningrad (Polytechnical Institute)

Card 2/3

ACCESSION NR: AP4019866

8/0181/64/006/003/0943/0945

AUTHORS: Morozov, Yu. A.; Shul'man, A. R.

TITLE: Elastic reflection of electrons from tungsten in the energy range from 100 to 2000 eV

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 943-945

TOPIC TAGS: electron reflection, elastic reflection, secondary emission, electron energy, nonelastic reflection

ABSTRACT: The method of study has been described previously by Yu. A. Morozov (Radiotekhn. i elektron., 8, 1045, 1963). The principal interest in the present work is secondary emission of electrons, reflected from targets with energies close to the initial values. A sealed instrument was used for measurements, with pressures not exceeding  $5 \cdot 10^{-9}$  mm Hg. All samples were cleaned prior to testing: they were placed in the instrument and heated to the limiting temperature for the substance (not exceeding 1900°C). Measurements were made on the elastic electron reflection, nonelastic electron reflection, electron energy, and secondary emis-

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ACCESSION NR: AP4019866

sion. The results are summarized in Fig. 1 on the Enclosure. It was found that the coefficient of elastic reflection ( $R$ ) in the investigated energy range reached 2-3%. The effect of increase in  $R$  with increase in electron energy ( $E_p$ ) depends on the surface state of the target. For spongy Ta the effect is much weaker than for smooth Ta. The value of  $R$  and the irregular change in number of reflected electrons with increase in  $E_p$  cannot be explained by the existing theory concerning electron reflection from a one-dimensional potential barrier at the metal-vacuum boundary. Results show that the target film, when no effect of the base is indicated, consists of two or three monolayers for elastic reflection of electrons and increases in thickness for electrons that have lost some part of their energy. Orig. art. has: 2 figures.

ASSOCIATION: Leningradskiy politekhnicheskii institut im. M. I. Kalinina  
(Leningrad Polytechnical Institute)

SUBMITTED: 28Oct63

DATE ACQ: 31Mar64

ENCL: 01

SUB CODE: NP, SS

NO REF SOV: 001

OTHER: 000

Card 2/3

ACCESSION NR: AP4019866

ENCLOSURE: 01

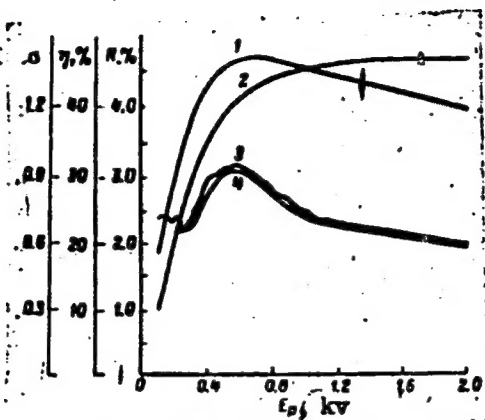


Fig. 1. Dependence of electron energy ( $E_p$ ) on coefficient of secondary emission  $\sigma$  (1), nonelastic electron reflection  $\eta$  (2), and elastic electron emission  $R$  at room temperature (3) of the target and at 1000C (4).

Card 3/3

ACCESSION NR: AP4017603

S/0109/64/009/002/0321/0332

AUTHOR: Shul'man, A. R.; Kanicheva, I. R.; Barzdo, B. F.

TITLE: Investigation of the penetration of 1-12 kev electrons through aluminum films

SOURCE: Radiotekhnika i elektronika, v. 9, no. 2, 1964, 321-332

TOPIC TAGS: electron penetration, aluminum penetration by electrons, penetrable aluminum film, 1-12 kev electron penetration, penetrated electrons formula

ABSTRACT: An experimental study of (a) the penetration of 12.5-178 microgram/cm<sup>2</sup> (500-7,100 Å) thick Al foils by 0.5-12-kev electrons and (b) the energy spectra of transmitted electrons is reported. Two experimental bulbs are described and their sketches supplied. Unlike H. Kanter's results (Phys. Rev., 1961, 121, 2, 461), almost entirely stopped electrons (with a 50 ev energy) were

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ACCESSION NR: AP4017603

observed past the Al film at critical energies of the incident electrons. It is shown that the electron range determined from the penetration curves refers to the stopped electrons. On the basis of experimental data obtained, this relation between the cross range of electrons and their energy is proposed:  $R = 480 E^{1.3}$ . However, it is hard to establish an agreement between this formula and the theory as the ratio  $l/d$  is unknown ( $l$  is the actual electron path in the film,  $d$  is the film thickness). The energy spectra measurements showed a wide spread in energy losses which does not agree with the well-known Bohr and E. J. Williams theoretical data developed for beta particles. Orig. art. has: 12 figures and 1 formula.

ASSOCIATION: none

SUBMITTED: 05Jan63

DATE ACQ: 18Mar64

ENCL: 00

SUB CODE: PH, NS

NO REF SOV: 004

OTHER: 014

Card 2/2

L 19580-65 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pu-4 IJP(c)/AFWL JD/JG

ACCESSION NR: AP4044652

S/0048/64/028/008/1346/1353

AUTHOR: Shul'man, A.R.; Kirsanova, T. S.; Solov'yeva, A. I.; Natadze, D. L.

TITLE: Evaporation of barium oxide from tungsten and molybdenum substrates (Report, 11th Conference on Cathode Electronics held in Kiev, 11-18 Nov. 1963)

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v. 28, no. 8, 1964, 1346-1353

TOPIC TAGS: oxide cathode, barium inorganic compound, cathode coating

ABSTRACT: In view of the fact that the service life of many thermionic cathodes is largely determined by the rate of evaporation of the active coating, in the present paper there was investigated the evaporation of the conventional coating - barium oxide - from tungsten and molybdenum substrates. An earlier study (Yu.G.Ptushinskiy and B.A.Chuykov, Radiotekhnika i elektronika 7,687,1962) indicated that the vaporization process may be a two-stage one. The procedure employed was similar to that used by other investigators: the barium oxide was coated on a tungsten (molybdenum) ribbon which was heated and its thermionic emission (work function) measured; parallel to the specimen ribbon and at a distance of 2-2.5 mm from it there was a "collector" ribbon onto which some of the evaporated material settled. The emission from this was also measured. The possibility of chemical reaction of the barium oxide with the substrate is discussed. The heating temperatures ranged from about 900

L 19580-65

ACCESSION NR: AP4044652

to 2000°K. The results are presented in the form of curves giving the temperature and heating time dependences of the emission current, the rate of vaporization and the heat of evaporation. It was found that determination of the parameters characterizing the evaporation of barium oxide films adsorbed on W and Mo is more complicated than analogous measurements for alkali and alkaline earth coatings. The difficulty stems in part from the fact (demonstrated in the present experiments) that the deactivation curve for an oxide coating does not agree with the true desorption curve. The heat of evaporation appears to depend on the temperature and on the degree of coating. Consequently, the rate of vaporization and the effective service life of the coating should also depend on both these factors. Orig.art.has: 2 formulas and 2 figures.

ASSOCIATION: none

SUBMITTED: OO

ENCL: OO

SUB CODE: EC, EM

NR REF SOV: 007

OTHER: 001

2/2

SHUL'MAN, A.S.

Shire razvernut' raboty po osvoeniiu malykh rek. /To develop the work of making lesser rivers navigable/. (Rechnoi transport, 1949, no. 3, p. 20-22). DLC: TC601.R4

SO: Soviet Transportation and Communication, A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified.

SHUL'MAN, Aleksandr Samoylovich; SEMIKIN, N.V., red.; NIKOLAYEVA,  
L.N., tekhn. red.

[Transportation of the Russian Federation during the seven-  
year plan period] Transport Rossiskoi Federatsii v semiletii.  
Moskva, Nauchno-tekhn. izd-vo M-va avtomobil'nogo transp. i  
shosseinykh dorog RSFSR, 1960. 103 p. (MIRA 14:6)  
(Transportation)

~~SHUL'MAN, Aleksandr Samoylovich; SEMIKIN, N.V., red., SEROVA, A.P.,~~  
~~red. izd-va; GORYASHKINA, R.A., tekhn. red.~~

[Ways to improve the utilization of capital assets in automotive transportation enterprises] Puti uluchsheniia ispol'zovaniia osnovnykh fondov avtotransportnykh predpriatii.  
Moskva, Avtotransizdat, 1963. 85 p. (MIRA 16:8)  
(Transportation, Automotive--Management)

KALABUKHOV, F.V.; SEMIKIN, N.V.; SHUL'MAN, A.S.; BRAZOVSKAYA, T.I.;  
MIZINOV, V.N.; BASH, M.S.; BRONSHTEYN, L.A.; POLCHANINOV,  
P.V.; VERKHOVSKIY, I.A.; KOROL'KOV, A.I.; GERONIMUS, B.L.;  
STRYZHKOVA, N.I., red.; GALAKTIONOVA, Ye.N., tekhn. red.

[Principles of the economics of automotive transportation;  
for the aid of those studying the economics of automotive  
transportation] Osnovy ekonomiki avtomobil'nogo transporta;  
v pomoshch' izuchaiushchim ekonomiku avtomobil'nogo trans-  
porta. Moskva, Avtotransizdat, 1963. 357 p.

(MIRA 17:3)

1. Zaveduyushchiy kafedroy ekonomiki i organizatsii proiz-  
vodstva Moskovskogo avtomobil'no-dorozhnogo instituta (for  
BronshTEYN).

L 57125-65 EPF(c)/EPA(s)-2/EWT(m)/EWP(b)/EWP(t) Pr-4/Pt-7 IJP(c) JD/JG

ACCESSION NR: AP5014598

UR/0181/65/007/006/1877/1878

AUTHOR: Sidorov, V. I.; Shul'man, A. Ya.; Sushko, T. Ye.

TITLE: The influence of the electric field on the longwave edge of impurity photoconductivity of germanium alloyed with zinc and mercury <sup>43</sup><sub>42</sub><sup>5</sup>

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1877-1878

TOPIC TAGS: impurity photoconductivity, germanium impurity photoconductivity, impurity center, photoconductivity

ABSTRACT: The impurity photoconductivity of Ge:Zn:Sb p-type (level 0.09 ev,  $N_{Zn} \sim 10^{15} \text{ cm}^{-3}$ ) and Ge:Hg (level 0.087 ev,  $N_{Hg} \sim 10^{14} \text{ cm}^{-3}$ ) specimens was measured at the temperatures of liquid helium and solid nitrogen for different electric field intensities. The position and shape of the longwave edge of impurity photoconductivity were found to depend on the applied electric field. An increased electric field caused a shift in the longwave boundary to the side of smaller energies and changed the shape of the curve. The shift of the boundary was linked with the lowering of the potential barrier of the impurity center resulting from the application of the electric field. Experimental data show that in a range of fields from 2 to 100 v/cm the boundary shift, taken along the 0.5 level, can be expressed as

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ACCESSION NR: AP5014598

$$\Delta\epsilon_{0.5} = -A_2 \sqrt{\frac{Ze^3}{\epsilon}} E,$$

where the constant  $A \approx 3$ ,  $Z$  is the charge number of the impurity center,  $\epsilon$  is the dielectric constant,  $E$  is the intensity of applied field, and  $e$  is the electron charge. In addition to the shift of the longwave boundary in the Ge:Zn:Sb specimen at helium temperature, a photosensitivity peak appeared at energies of 0.075—0.078 eV. It is assumed that this peak is associated with the excited states of  $Zn^-$ . Orig. art. has: 2 figures. [JA]

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radiotechnology and Electronics, AN SSSR)

SUBMITTED: 13 Jan 64

ENCL: 00

SUB CODE: EM, SS

NO REF SOV: 001

OTHER: 002

ATD PRESS: 4036

Card 2/2

L 11951-66 EWT(1)/EWT(m)/EWP(t)/EWP(b)/EWA(m)-2 LJP(c) JD/AT

ACC NR: AP6000739

SOURCE CODE: UR/0386/65/002/009/0423/0426

AUTHOR: <sup>44,55</sup>Lifshits, T. M.; <sup>44,55</sup>Oleynikov, A. Ya.; <sup>44,55</sup>Shul'man, A. Ya. 81.  
78  
B

ORG: <sup>44,55</sup>Institute of Radio Engineering and Electronics, Academy of Sciences, SSSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

TITLE: <sup>21, 44,55</sup>Scattering of electron gas energy in n-InSb at <sup>44,55</sup>helium temperatures

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. <sup>21</sup>Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 9, 1965, 423-426

TOPIC TAGS: indium alloy, electron collision, electric conductivity, relaxation process, temperature dependence, <sup>21</sup>electron gas, crystal lattice

ABSTRACT: To study the energy scattering mechanisms in InSb, the authors investigated the field and temperature dependences of the time of electric conductivity relaxation of n-InSb samples, which is simultaneously the time required to transfer the excess average energy from the electron gas to the crystal lattice. The tests consisted of measuring the active and reactive components of the complex admittance of a sample with nonlinear voltage-current characteristic, and calculating from these components the relaxation time  $\tau$  of the average energy for each value of the lattice temperature and of the power dissipated in the sample. It is noted that the electric-conductivity relaxation time depends on the circuit parameters and on the manner in which the sample is connected in the circuit, this being the consequence of the pump action of the battery. To compare the obtained data with theory, the authors used

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ACC NR: AP6000739

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the results of a calculation of the electron energy loss function  $P(T)$  for scattering by the piezoelectric and deformation potentials of the acoustic phonons and by the optical phonons, obtained by Sh. M. Kogan (FTT v. 4, 2474, 1962) and H. Frohlich and B. V. Paranjape (Proc. Phys. Soc. v. B69, 21, 1956), respectively. Comparison of the experimental and theoretical curves leads to the conclusion that the nonmonotonic dependence of  $\tau_p$  on  $T$  is connected with the interchange of mechanisms for the transfer of energy to the lattice from the electron gas when the temperature of the latter increases. When  $T < 8K$ , energy scattering by the piezoelectric potential of the acoustic phonons predominates. At electron temperatures  $T \geq 10K$ , the agreement between theory and experiment is only qualitative. Authors are grateful to Sh. M. Kogan for a valuable discussion. Orig. art. has: 1 figure and 1 formula. 44,55

SUB CODE: 20/ SUBM DATE: 08Sep65/ ORIG REF: 003/ OTH REF: 002

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Card 2/2

L 23463-66 EWT(1)/EWT(m)/EEC(k)-2/I/EWT(t)/EWT(k) LIP(c) WC/ID  
 ACC NR: AP6012806 SOURCE CODE: GE/0030/66/014/002/0511/0521 68  
 64

AUTHOR: Lifshits, T. M.; Oleinikov, A. Ya.; Shulman, A. Ya.

ORG: Institute of Radio Engineering and Electronics, Academy of Sciences of USSR, Moscow B

TITLE: On the electron gas energy relaxation mechanisms in n-type InSb at helium temperatures 21, VII, 51

SOURCE: Physica status solidi, v. 14, no. 2, 1966, 511-521

TOPIC TAGS: indium antimonide, relaxation energy, piezoelectric scattering, phonon, crystal lattice, Hall constant, electric conductivity

ABSTRACT: The relaxation time of the electrical conductivity ( $\sigma$ ) and the nonlinear coefficient  $\beta$  were investigated in n-type InSb as a function of the dc power applied to the samples. Measurements of the active and reactive components of  $\sigma$  were performed between 1.8 and 4.1K. Samples  $10 \times 1 \times 1$  mm with an excess electron concentration  $= 3-5 \times 10^{13} \text{ cm}^{-3}$  and a mobility  $= 2-5 \times 10^4 \text{ cm}^2/\text{v}\cdot\text{sec}$  were used in the experiments. It was established that the average electron relaxation time in InSb at helium temperatures depends on the power supplied to the sample. This dependence is not monotonic, due to the change of

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ACC NR: AP6012806

mechanisms of energy transfer to the lattice from the electron gas during increase of its temperature. When the temperature of the lattice is that of liquid helium and the electron temperature is less than 8K, the predominant mechanism of energy loss is the loss by the piezoelectric potential of acoustic phonons. This mechanism determines the increase of  $\tau$  with  $T$  and also the S-type shape of the dc current-voltage characteristic at low lattice temperatures. The deformation potential of acoustic phonons contributes relatively little to the energy loss. From the data on  $\tau/T$  it was determined that the piezoelectric modulus in InSb  $e_{14} = 2.6 \times 10^4 \text{ dyn}^{1/2} \text{ cm}^{-1}$  and that the deformation potential constant  $\mathcal{E}_c < 10 \text{ eV}$ . At  $T \geq 10 \text{ K}$  the predominant energy loss mechanism is the generation of optical phonons. However, it is necessary to calculate a special electron energy distribution function in the electrical field to take into account this dissipation. The authors are grateful to Sh. M. Kogan for valuable discussion, to G. A. Zhurkina for performing the computations, and to Yu. E. Barkalov and E. A. Lobodayev for their assistance in carrying out the measurements. Orig. art. has: 9 formulas and 6 figures. [CS]

SUB CODE: 20/ SUBM DATE: 07Feb66/ ORIG REF: 008/ OTH REF: 010  
ATD PRESS: 4236

Card 2/2. VLR

L 04668-67 EWT(1)/EWT(m)/T/EWP(t)/ETI IJF(c) JD

ACC NR: AP6024459

SOURCE CODE: UR/0181/66/008/007/2022/2024

AUTHOR: Sidorov, V. I.; Sushko, T. Ye.; Shul'man, A. Ya.

ORG: Institute of Radio Engineering and Electronics, AN SSSR, Moscow (Institut radio-  
tekhniki i elektroniki AN SSSR)

TITLE: Investigation of optic absorption in germanium doped with zinc and compensated  
with antimony

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2022-2024

TOPIC TAGS: optic absorption, germanium semiconductor, impurity center, excited state,  
ionization

ABSTRACT: This a continuation of earlier work (FIT v. 6, 3294, 1964 and preceding)  
where it was shown that the electrophysical photoelectric characteristics of germanium  
doped with zinc and compensated with antimony (Ge:Zn:Sb) depends strongly on the con-  
centration of the Zn<sup>-</sup> centers. The present investigation was aimed at determining the  
influence of the impurity concentration on the optical properties of Ge:Zn:Sb. The  
Zn<sup>-</sup> concentration was varied from  $1.4 \times 10^{14}$  to  $3 \times 10^{16} \text{ cm}^{-3}$ . The investigation of  
the absorption was in an optical helium cryostat. The impurity optical absorption was  
measured by first passing monochromatic light through the investigated sample onto an  
infrared receiver, and then applying the light to the receiver without the sample.  
The results showed an appreciable growth of the coefficient of impurity absorption at  
 $h\nu > .75 \text{ Mev}$ , with two maxima on the curves, corresponding to the transition of the

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L 04668-67

ACC NR: AP6024459

holes from the ground state of the impurity center to the excited state. The positions of the two maxima were independent of the concentration and were  $75.4 \pm 0.7$  and  $78.7 \pm 0.3$  Mev. An increase in the concentration of the  $Zn^-$  centers to  $3 \times 10^{16} \text{ cm}^{-3}$  does not lead to a change in the energy distance between the levels of the  $Zn^-$  center, causing only a smearing of the excited state. The energy of optical ionization of the  $Zn^-$  center was found to be 82.7 Mev. It is shown that the time constant for recombination inter-impurity transitions of the hole from a  $Zn^0$  center to a  $Zn^-$  center is at least  $10^4$  times larger than the time for capture of a free hole by the  $Zn^-$  center. The authors thank T. M. Lifshits and Sh. M. Kogan for interest in the work and a discussion. Orig. art. has: 1 figure, 3 formulas, and 1 table. 2

SUB CODE: 20/ SUBM DATE: 18Nov65/ ORIG REF: 003/ OTH REF: 007

kh

Card 2/2

ILYUKOVICH, A.M.; SHUL'MAN, B.R.

Sources of calibrated a.c. voltage for checking instruments.  
Izm. tekhn. no.1:56-58 Ja '64.

(MIRA 17:11)

ILYUKOVICH, A.M.; SHUL'MAN, B.R.

Stabilizers and stable a.c. supply sources used in measuring  
equipment. Izv.tekh. no.2:42-45 F '64. (MIRA 17:4)

IL'YARCHIK, A. I. and Il'yashaylovich; SHUL'MAN, Boris Rafailovich;  
1965, G.D., red.

[regulators and regulated a.c. power supply sources] Sta-  
bilizatory i stabilizirovannye istochniki pitaniia pere-  
mennogo toka. Moskva, Energiia, 1965. 119 p. (Biblio-  
teka po avtomatike, no.146) (MIRA 18:10)

GOLUB', S.G.; SHUL'MAN, B.R.

Semiconductor amplifiers with a high input resistance. Izv.  
tekh. no.11:59-62 N '64. (MIRA 18:3)

LIPCHENKO, V.D.; SLESAREVA, T.A.; SHURSHIKOVA, P.A.; SHUL'MAN, D.I.;  
SMIRNOV, Ye.V.; KONOVALOVA, N.A.; PEN'KOV, Ye., red.; LEBEDEV,  
A., tekhn.red.

[Collection of exercises in calculating industrial production  
costs] Sbornik uprazhnenii po kal'kulirovaniu sebestoimosti  
promyshlennoi produktsii. Moskva, Gosfinizdat, 1959. 207 p.  
(MIRA 12:11)

(Costs, Industrial)

LATASH, L. P. and SHULMAN, D. R. (Moscow, USSR)

"E E G changes in malignant exophthalmos as an indicator of the participation of mesodiencephalic structures in the genesis of the disease"

Report submitted to the 7th Intl. Congress of Neurology,  
Rome, Italy, 10-15 Sep 61

LITVAK, R.V.; SHUL'MAN, E.A.

Some data on the antigenic structure of *Shigella sonnei* and preparation of agglutinating and precipitating immune serums. Zhur.mikro-biol. epid. i immun. no.11:54-58 N '54. (MLRA 8:1)

1. Iz Moskovskogo instituta vaktsin i syvorotok (dir. M.G.Kashtanova, nauchnyy rukovoditel' prof. V.A.Chernokhvostov)

(SHIGELLA,

*sonnei* antigenic structure & prep. of immune sera)

(IMMUNE SERUMS,

*Shigella sonnei* immun. serum)

SHUL'MAN, E.A.; SHATROV, I.I.; BRONSHTEYN, N.I.; LISINA, S.P.; MOROZOVA,  
Ye.S.; GOHBUNOVA, T.S.

Immunological reactions following typhus fever. Zhur.mikrobiol.  
epid.i immun. no.5:63-68 My '55. (MLRA 8:7)

1. Iz Moskovskogo gorodskogo instituta epidemiologii i bakterio-  
logii (rukovoditel' -prof. M.M.Mayevskiy).  
(TYPHUS, immunology,  
immun. reactions after)

YAKHNINA, N.A.; SHATROV, I.I.; MORDVINOVA, N.B.; KUZNETSOVA, N.S.;  
SHAPOSHNIKOVA, R.P.; SHOLIMAN, E.A.; KAZACHINA, K.N.; PEROVA, L.V.;  
SALAMANDRA, E.G.; SINAY, A.Ya.; SHERISHEVSKAYA, Ye.F.; SHABAD, A.T.;  
GOLUBEVA, T.V.

Biological properties of causative agents isolated in various  
clinical forms of dysentery. Zhur. mikrobiol. epid. i immun.  
31 no.3:128 Mr '60. (MIRA 14:6)  
(SHIGELLA PARADYSENTERIAE)

SMIRNOVA-MUTUSHEVA, M.A.; KAGANOVSKAYA, S.N.; LITINSKIY, Yu.I.; MARKUS,  
V.D.; SHUL'MAN, E.A.; DOVZHIK, R.M.; FEDOROVA, O.A.

Bacteriological diagnosis of salmonellosis. Lab. delo 8 no.10:  
48-49 '62 (MIRA 17:4)

1. Laboratoriya Moskovskoy gorodskoy sanitarnno-epidemiologicheskoy stantsii i sanitarnno-epidemiologicheskoye stantsii Kalininskogo, Moskvoretskogo i Leninskogo rayonov.

SHUL'MAN, F.R.

KIT, S.P.; SHUL'MAN, F.R.

Conveying apparatus used for hauling reinforced concrete products.  
Rats. i izobr. predl. v stroi. no.3:15-16 '57. (MIRA 11:1)  
(Reinforced concrete) (Conveying machinery)

KIT, S.P.; LEBEDEVA, Z.S.; SHUL'MAN, F.R.

Automatically controlled unit for the electrothermal treatment of reinforcing bars. Suggested by S.P.Kit, Z.S.Lebedeva, F.R.Shul'man.  
Rats.1 izobr.predl.v stroi. no.16:9-11 '60. (MIRA 13:9)

1. Po materialam zavoda zhelezobetounykh izdeliy No.5 Glavprom-  
stroymaterialov Mosgorispolkoma, Moskva, 4-y Dubrovskiy proyezd,  
d.3. (Reinforcing bars) (Electric heating)

SHUL'MAN, G.

"Economic aspects of the poultry processing industry" by N.  
Kondratiuk. Reviewed by G. Shul'man. Mias. ind. SSSR 32  
no.4:52 '61. (MIRA 14:9)

1. Moskovskiy ptitsekombinat.  
(Poultry industry) (Kondratiuk, N.)

SHUL'MAN, G.; TUGAY, V.

Brigade system for line slaughtering and processing of poultry. Mias.  
ind.SSSR 32 no.6:38-39 '61. (MIRA 15:2)

1. Moskovskiy ptitsekombinat (for Shul'man). 2. Tsentral'nyy  
nauchno-issledovatel'skiy institut ptitsepererabatyvayushchey  
promyshlennosti (for Tugay).  
(Poultry plants--Labor productivity)

L 6466-66 EWT(m) DIAAP

ACC NR: AP5025253

SOURCE CODE: UR/0386/65/002/004/0164/0167

AUTHOR: Izmaylov, S. V.; Shul'man, G. A. 44,55

ORG: Leningrad State Pedagogical Institute im. A. I. Gertseva (Leningradskiy gosudarstvennyy pedagogicheskiy institut) 44,55

TITLE: Filling of electron shells of compressed atoms in the statistical model

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu (Prilozheniye), v. 2, no. 4, 1965, 164-167

TOPIC TAGS: nuclear shell model, electron shell, pressure effect, quantum number

ABSTRACT: Starting from the simplified Sommerfeld condition the authors show that for a compressed atom the first appearance of s-, p-, d-, and f-electrons will be determined by the formula

$$Z_l = 1.26(1 - \gamma)(1 + \frac{1}{2})^3$$

where  $l$  is the quantum number,  $\gamma$  is a correction term, and  $Z$  is the atomic number of the element. The factor  $(1 - \gamma)$  will decrease with increasing pressure, and consequently, the atomic number  $Z$  of the element in which the electrons with given quantum number  $l$  first appear will also decrease. It is easy to determine the factor  $(1 - \gamma)$ , meaning also the parameter  $\Lambda$ . It is also shown that formation of electronic groups in a compressed atom depends essentially on the pressure, that the number of the d- and f-electrons increases appreciably in atoms with increasing pressure, and that g-

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L 6466-66

ACC NR: AP5025253

9

electrons also appear; on the other hand, the number of s- and p-electrons increases very little. The first appearance of electrons with a given quantum number shifts towards the elements whose atomic numbers are smaller than atomic numbers corresponding to the periodic table. An analogous calculation was carried out for a compressed atom in the statistical model with account of quantum corrections that have the same order of magnitude. In the model with the corrections, the dependence of the energy of the atomic shell on the radius is such that one can speak of its finite dimensions in the absence of pressure. This makes it possible to determine for several elements the pressure at which the electrons with a given quantum number first appear. A table is presented, listing for several elements the calculated pressures in the Thomas-Fermi model and in the model with the quantum corrections. Authors are grateful to I. V. Shirmanova, V. T. Aleksandrov, and G. G. Gurbanov for programming and help in the calculations. Orig. art. has: 1 figure, 6 formulas, and 1 table.

SUB CODE: NP/ SUBM DATE: 11Jun65/ ORIG REF: 002/ OTH REF: 003

nw

Card 2/2

L 7738-66 EWT(1)/EWT(m)/EWP(t)/EWP(b)/EWA(h) JD

ACC NR: AP5025905

SOURCE CODE: UR/0057/65/035/010/1889/1896

AUTHOR: Izmaylov, S.V.; Shul'man, G.A.

ORG: Leningrad State Pedagogical Institute im. A.I.Gertsen (Leningradskiy gosudarstvennyy pedagogicheskiy institut)

TITLE: On the theory of the periodic system of the elements at high pressures. 1.

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 10, 1965, 1889-1896

TOPIC TAGS: atomic structure, high pressure, periodic system, Fermi statistical theory, theoretic physics

ABSTRACT: The influence of pressure on the electronic structure of atoms is discussed with the aid of the statistical atomic model. The atomic electrons are assumed to be confined by the pressure to the interior of a sphere of finite radius and to be distributed according to the Lenz-Jensen formula. The Lenz-Jensen distribution is employed because it approximates the Fermi-Thomas distribution and is more tractable. The relation between the pressure and the radius of the atom is obtained from the expression of the Fermi-Thomas model for the electron kinetic energy, and the free parameter in the Lenz-Jensen distribution is determined from the condition that the total energy (for fixed radius) be minimum. It is found that increase of pressure tends to cause electronic states of higher orbital angular momentum to become occu-

Card 1/2

UDC: 539.0

Card

2/2

L 40900-66 EMT(k)/EMT(l)/EMT(m)/EMF(t)/ETI IOP(c) GG/WJ/JP

ACC NR: AP6011382

SOURCE CODE: UR/0057/66/036/003/0405/0412 54

AUTHOR: Izmaylov, S.V.; Shulman, G.A. 50  
B

ORG: Leningrad State Pedagogical Institute im. a.I.Gertsen (Leningradskiy gosudarstvennyy pedagogicheskiy institut)

TITLE: On the theory of the periodic system of the elements at <sup>2</sup>high pressures. 2. 16

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 3, 1966, 405-412

TOPIC TAGS: periodic system, atomic structure, statistical theory, pressure effect

ABSTRACT: In an earlier paper (ZhTF, 35, 1889, 1965) the authors discussed the periodic system at high pressures on the basis of the Fermi-Thomas model and showed that the formation of electron shells in the atom, the first appearance of electrons with a given azimuthal quantum number, and the mean angular momentum of the electrons in the atom depend significantly on the pressure. In the present paper, which the authors characterize as "preliminary", those calculations are generalized, on the basis of the "generalized statistical model", to take into account the exchange and second order quantum corrections to the kinetic energy, as well as the correlation correction. The calculations were performed with the Lentz variational method as employed earlier by H.Jensen (Zs. Phys., 77, 722, 1932), with the expression  $A \exp(-(\lambda r)^{1/\beta})$  for the electron density in the atom. Here A is a normalizing factor,  $\lambda$  is a variational

Card 1/3

UDC: 539.183.3

L 40900-66

ACC NR: AP6011382

3

parameter, and the parameter  $\beta$  was constrained to have the value 5. The Wigner-Seitz condition was imposed at the boundary of the compressed atom, and it is shown that the error arising from the fact that the assumed density distribution does not satisfy that condition is negligible. The calculated pressures at which f electrons first appear in a number of atoms with atomic numbers ranging from 39 to 56 are tabulated. These pressures are lower by about a factor of 2 than those calculated with the Fermi-Thomas model; pressures calculated with and without inclusion of the correlation correction differed very little. The numbers of s, p, d, f, and g electrons in an atom were calculated as functions of the atomic number for two different pressures. The numbers of d and f electrons were found to increase with increasing pressure. The numbers of s and p electrons were found also to increase slightly with increasing pressure, although according to P.Gombas (Acta Phys. Hung., 7, 365, 1957) they should decrease. This discrepancy is ascribed to neglect of the variation of the parameter  $\beta$  with both pressure and atomic number. Formulas were derived for the mean and the mean square angular momentum of the atomic electrons, and they are discussed very briefly. According to the present calculations, based on the generalized statistical model of the atom, reconstitution of the electron shells takes place at pressures ranging in order of magnitude from  $10^4$  to  $10^8$  atmospheres. It is noted, however, that those pressure values cannot be regarded as accurate because the expression assumed for the density provides only a rough approximation to the true electron density within the atom, particularly in view of the fact that the parameter  $\beta$  was not varied. The authors thank I.V.Shirmanova, V.T.Aleksandrov, and G.G.Gurbanov for programming

Card 2/3

L 40900-66

ACC NR: AP6011382

and assistance with the computing, and V.V. Anikiyev for making the computer available.  
Orig. art. has: 35 formulas, 2 figures, and 2 tables.

SUB CODE: 20, 07/

SUBM DATE: 01Apr65/

ORIG REF: 007/

OTH REF: 009

*nd*  
Card 3/3

ACC NR: A57001305

SOURCE CODE: UR/0057/66/036/012/2131/2135

AUTHOR: Shul'man, G.A.

ORG: Leningrad State Pedagogic Institute im. A.I. Gertsen (Leningradskiy gosudarstvennyy pedagogicheskiy institut)

TITLE: On the theory of the periodic system of the elements at high pressures

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 12, 1966, 2131-2135

TOPIC TAGS: periodic system, high pressure, atomic structure, electron shell, Fermi statistical theory, quantum number

ABSTRACT: This paper presents a continuation of earlier work of the author and S.V. Izmaylov (ZMTF, 35, 1889, 1965; 36, 405, 1966) on the effect of very high pressure on the electron shell structure of atoms. In all the papers of this series the number of electrons with a given angular momentum quantum number is calculated as a function of the nuclear charge  $Z$  and the pressure. The earlier calculations were based on the Lentz-Jensen variational method, whereas the present calculations are based on the Thomas-Fermi model. The boundary condition at the edge of the atom for the solution of the Thomas-Fermi equation is related to the pressure, and the number of electrons with a given angular momentum quantum number is calculated with a formula due to Fermi. The variational calculations indicate that the numbers of  $s$ ,  $p$ ,  $d$  and  $f$

UDC: 541.9

Card 1/2

ACC NR: AP 7001305

electrons in a heavy atom increase with increasing pressure (at the expense of the number of electrons with higher angular momenta), whereas the Fermi-Thomas calculations indicate a more complex behavior. This difference in the results is traced to the fact that the variational method does not give sufficient weight to the structure of the outer region of the atom. At pressures of  $10^5$  to  $10^7$  atm, electrons with a given angular momentum quantum number first appear in lighter atoms than at low pressures. At pressures of the order of  $10^8$  atm the electron orbits are filled in the normal sequence (i.e., the shell with a given principal quantum number is filled before electrons belonging to the next higher shell appear), rather than in the anomalous sequence observed at low pressures (where, e.g., the 4s electrons appear before the 3d ones). At pressures above  $10^8$  atm the outermost electrons are no longer attached to a specific atom. The author thanks Professor S.V.Izmaylov for discussions. Orig. art. has: 11 formulas, 3 figures and 1 table.

SUB CODE: 20

SUBM DATE: 22Sep65

ORIG. REF: 005

OTH REF: 002

Card 2/2

Shul'man, G.S.

2

621.386.828 : 621.386.81  
3162. INTERFERENCE TO RADIO RECEPTION, PRODUCED BY  
MERCURY-VAPOUR RECTIFIERS IN TRANSMITTERS.

G.S. Shul'man.

Radiotekhnika, Vol. 11, No. 11, 60-1 (1956). In Russian.

The interference to radio reception on the medium-wave band, produced by mercury-vapour rectifiers of transmitters in the standard condition, is discussed and methods of suppressing this interference considered. A conventional capacitative mains filter on the transmitter is found to be adequate.

V.V. Zakharov

SHUL'MAN, G.S.

The MSTA marine radio transmitter. Biul.tekh.-ekon.inform.Gos.nauch.-  
issl.inst.nauch.i tekh.inform. 17 no.1:47-48 '64. (MIRA 17:2)

LITVINOV, V.I.; SHUL'MAN, G.S.

Effect of the material of which a ship hull and its superstructures  
are made on the resistance to the loss of ship antennas. Inform. sbor.  
TSNIIMF no.85 Sudovozh, i sviaz' no.22:68-72 '63. (MIRA 17:3)

SHUL'MAN, G. Ya.

"Toxic Conditions in Infants and Young Children." Cand Med Sci, Sverdlovsk  
State Medical Inst, Sverdlovsk, 1954. (ZL, No 1, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher  
Educational Institutions (12)  
SO: Sum. No. 556, 24 Jun 55

SHUL'MAN, G.Ya.

Peculiarities of the course of typhoid fever and paratyphoid fever diseases in nursing infants and small children. *Pediatrics* no.4:81 J1-Ag '55. (MLRA 8:12)

1. Iz Sverdlovskogo nauchno-issledovatel'skogo instituta ikhrany materinstva i mladenchestva.  
(INFANTS-- DISEASES) (PARATYPHOID FEVER) (TYPHOID FEVER)

MALYSHEVA, R.A.; SHUL'MAN, G.Ya.; MYZNIKOVA, N.Ya.

Catamnesis of prematurely born children up to the age of 3-4  
years. Vop.okh.mat.i det. 8 no.3:85 Mr '63. (MIRA 16:5)

1. Iz pediatricheskogo otdela Sverdlovskogo instituta okhrany  
materinstva i mladenchestva Ministerstva zdavookhraneniya  
RSFSR.

(INFANTS (PREMATURE)) (CHILDREN--DISEASES)

SARAKHANOV, Konstantin Konstantinovich; SHUL'MAN, Georgiy Yakovlevich;  
GADALEV, Yu.A., red.; BARANOV, I.A., tekhn.red.

[Murmansk Economic Administrative Region] Murmanskii ekonomicheskii administrativnyi raion. Murmanskoe knizhnoe izd-vo.  
1959. 162 p. (MIRA 12:8)  
(Murmansk Province--Economic conditions)

SHUL'MAN, G.Ye.

Respiratory function of skin in gobies. Zool.zhur.35 no.2:314-316  
P '56. (MLRA 9:7)

1.Azovsko-Chernomorskiy nauchno-issledovatel'skiy institut morskogo  
rybnogo khozyaystva i okeanografii (Azchernire).  
(Gobies) (Respiration)

MAKHIN'KO, V.I.; KHASKIN, V.V.; SHUL'MAN, G.Ye.

Some features of nitrogen metabolism at a great age. Uch.zap.KHGU  
68:193-213 '56 (MIRA 11:11)

1. Kafedra fiziologii cheloveka i zhiivotnykh Nauchno-issledovatel'-  
skogo instituta biologii i biologicheskogo fakul'teta Khar'kovskogo  
ordena trudovogo krasnogo znameni gosudarstvennogo universiteta imeni  
A.M. Gor'kogo.

(NITROGEN METABOLISM) (OLD AGE)

CHUL'YAN, G.Ye.; TENGREKHIN, G.I.; POBENIKH, V.N.

Characteristics of gas exchange in the cottoid fishes (*Halargus melanostomus* and *H. caucasicus*) of the Sea of Azov as related to the environmental conditions. Vopr. ikht. no. 2:77-80, 1971. (Izv. 10:8)

1. Nauchno-Issledovatel'skiy Institut morskoy  
rybnogo khozyaystva i okeanografii.  
(Azov, Sea of--Sculpin)  
(Respiration)

SALIKH, S.Ye., Zool Bio Sci--(disc) "Study of the dynamics of the  
characterization of <sup>to</sup> Azovskaya <sup>anchovy</sup> in connection with <sup>pre-spawning</sup> ~~the spawning~~  
periods. ~~spawning~~ <sup>spawning</sup> The reproduction periods of the ~~yearly~~ <sup>annual</sup> cycle." Mos, 1953. 17 pp  
(Zool Sci USSR. Inst of Morphology of <sup>Animals</sup> ~~Animals~~ in A.N.Sevast'yanov), 150 co-  
l. (11,44-51, 195)

SHUL'MAN, G.Ye.

Materials on the characteristics of metabolism in the Azov anchovy.  
Trudy sov.Ikht.kom. no.8:214-231 ' 58. (MIRA 11:11)

1. Azovo-Chernomorskiy nauchno-issledovatel'skiy institut morskogo  
rybnogo khozyaystva i okeanografii.  
(Azov, Sea of--Anchovies) (Metabolism)

SHUL'MAN, G.Ye.

Chemical composition of anchovies of the Sea of Azov during the  
prespawning, spawning and premigratory periods of their annual life  
cycle. Report No.1: Variations in the relative and absolute quantity  
of fat. Vop. ikht. no.13:170-181 '59. (MIRA 13:3)

1. Azovo-Chernomorskiy nauchno-issledovatel'skiy institut morskogo  
rybnogo khozyaystva i okeanografii (AzcherNIRO).  
(Azov, Sea of--Anchovies) (Fishes--Physiology)

3(9), 17(4)

AUTHOR:

Shul'man, G. Ye.

SOV/20-128-2-56/59

TITLE:

Distortion of the Usual Relation Between Age and Fatness in  
Azov Sea Anchovy

PERIODICAL:

Doklady Akademii nauk SSSR; 1959, Vol 128, Nr 2, pp 422-424  
(USSR)

ABSTRACT:

The percentage fat content in the fish body rises with increasing age (Refs 1-28). This is explained by the fact that in animals, including fish, the intensity of energy- and protein transformation abates with age. A shifting in the direction of fat accumulation takes place (Ref 29). This seems to be an undisputed fact to such extent that the contrary is valued as a paradox (Refs 10,14,31). Such inversions of the usual age relations have, however, become known (Refs 26,30). These phenomena are certainly caused by a higher fat consumption in the groups of advanced age, which is connected with the preparation for spawning. On the other hand, continuous distortions, sometimes without any connection with spawning, have also been observed in fish (Refs 7,9,31-33). No investigator has tried to clarify the causes. The author tries to find them with respect to the species of fish mentioned in the title.

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Distortion of the Usual Relation Between Age and  
Fatness in Azov Sea Anchovy

SOV/20-128-2-56/59

Figures 1 and 2 show the results. L. P. Minder ascertained in autumn 1933, a direct linear dependence between age and fatness of the anchovy migrating through the Strait of Kerch (Ref 11). As can be seen from the authors's data, he observed similar conditions in summer 1955. On the other hand, these rules were distinctly distorted in 1954 and in September 1955. This was also the case in the Black Sea in the same years (Refs 27, 34). A comparison with data on food conditions in the Azov Sea (Ref 35) showed that this distortion was due to a poor supply of nourishment. In the author's opinion, the same applies to other species of fish. With an improvement in life conditions, this inversion disappears, as it was the case with anchovy in May-June and October 1955. The author explains this circumstance as follows: the older the fish, the more energy must it apply (and the more food must it take) to synthesize the same quantity of substance (Ref 29). A considerable deterioration in the food supply primarily affects the older groups of fish. From the above it may be concluded that the relation between age and fatness of anchovy can give a good index of its

Card 2/3

Distortion of the Usual Relation Between Age and  
Fatness in Azov Sea Anchovy

SOV/20-128-2-56/59

biological state. There are 1 figure and 35 references, 19  
of which are Soviet.

ASSOCIATION: Azovsko-Chernomorskiy nauchno-issledovatel'skiy institut  
morskogo rybnogo khozyaystva i okeanografii (Azov-Black Sea  
Scientific Research Institute of Maritime Fishing Industry and  
Oceanography)

PRESENTED: May 22, 1959, by Ye. N. Pavlovskiy, Academician

SUBMITTED: May 6, 1959

Card 3/3

SHULMAN, G.Ye.

Dynamics of the chemical composition of anchovies of the Sea  
of Azov as related to their biological characteristics.

Trudy Azcherniro no.18:130-144 '60. (MIRA 14:10)  
(Azov, Sea of--Anchovies)

SHUL'MAN, G.Ye. (Kerch')

Fat content dynamics of the fish body. Usp. soov. biol. 49 no.2:  
225-239 Mr-Apr '60. (MIRA 13:11)  
(FISHES—PHYSIOLOGY) (FAT METABOLISM)

SHUL'MAN, G.Ye.

Chemical composition of the anchovy of the Sea of Azov during the prespawning, spawning, and premigration periods of its yearly life cycle. Report No.2. Vop. ikht. no.17:92-109 '61.

(MIRA 14:5)

1. Azovo-Chernomorskiy nauchno-issledovatel'skiy institut morskogo rybnogo khozyaystva i okeanografii (AZChERNIRO).

(Azov, Sea of—Anchovies)

(Proteins in the body)

SHUL'MAN, G.Ye.; DEMIDOV, V.F.

Changes in the fatness of sardines (*Sardinella surita* Valenciennes)  
in the Dakar region during the prespawning period of the annual  
cycle. Zool. zhur. 40 no.10:1532-1535 0 '61. (MIRA 14:9)

1. Azovo-Black Sea Research Institute of Marine Fishery Management  
and Oceanography, Kerch.  
(Dakar region--Sardines)

SHUL'MAN, G.Ye., kand.biologicheskikh nauk

Azov anchovy. Priroda 50 no.6:105-106 Je '61. (MIRA 14:5)

1. Azovo-Chernomorskiy nauchno-issledovatel'skiy institut morskogo  
rybnogo khozyaystva i okeanografii, Kerch'.  
(Anchovies)

SHUL'MAN, G.Ye.

Elements of the nitrogen balance and feed rations of the Azov anchovy (*Engraulis encrasicolus maeoticus* Pusanov). Dokl. AN SSSR 147 no:3:724-726 N '62. (MIRA 15:12)

1. Azovsko-Chernomorskiy nauchno-issledovatel'skiy institut morskogo rybnogo khozyaystva i okeanografii. Predstavleno akademikom Ye.N. Pavlovskim.

(Nitrogen metabolism) (Anchovies) (Fishes—Food)

SHUL'MAN, G.Ye.

~~SHUL'MAN, G.Ye.~~  
Determining the availability of food of fishes by the intensity  
of fat accumulation and the level of fat stored in the fish body.  
Zool. zhur. 42 no.4:581-588 '63. (MIRA 16:7)

1. Azovo-Black Sea Research Institute of Marine Fishery  
Management and Oceanography, Kerch.  
(Black Sea--Fishes--Food)  
(Azov, Sea of--Fishes--Food)

SHUL'MAN, G.Ye. (Kerch')

Types of the dynamics of fat content in Black Sea fishes.  
Usp. sovr. biol. 59 no.1:145-158 Ja-F '65.

(MIRA 18:3)

SHUL'MAN, I. A.

"Morphological Data on Ankylosis of the Mandibular Joint." Sub 28 May 51,  
First Moscow Order of Lenin Medical Inst.

Dissertations presented for science and engineering degrees in Moscow  
during 1951.

SO: Sum. No. 480, 9 May 55.

SHUL'MAN, I.A., kand.med.nauk

Case of a complex odontoma. Stomatologiya 40 no.4:95-96 J1-Ag  
'61. (MIRA 14:11)

1. Iz Tsentral'noy klinicheskoy bol'nitsy (nachal'nik V.N.  
Zakharchenko) Ministerstva putey soobshcheniya SSSR.  
(JAWS—TUMORS)

KHITROV, F.M., prof.; SHUL'MAN, I.A., kand.med.nauk

Osteochondroma of the mandible. Stomatologiya 41 no.4:87-88 J1-Ag  
'62. (MIRA 15:9)

1. Iz Tsentral'noy klinicheskoy bol'nitsy (nach.-zasluzhennyy  
vrach RSFSR V.N.Zakharchenko) Ministerstva putey soobshcheniya  
SSSR.

(JAWS--TUMORS)

PHASE I BOOK EXPLOITATION

SOV/6282

Gorenshteyn, I. A., I. A. Shul'man, and A. S. Safaryan

Inertsial'naya navigatsiya (Inertial Navigation). Moscow, "Sovetskoye radio", 1962. 248 p. Errata slip inserted. 9000 copies printed.

Ed. (Title page): G. O. Fridlender, Professor; Ed.: I. M. Volkova;  
Tech. Ed.: V. V. Belyayeva.

**PURPOSE:** This book is intended for designers and personnel in the air force, rocketry, and the navy. It can also be used by students in academies and institutes specializing in navigation instrument building.

**COVERAGE:** The book describes the construction, operating procedure, and adjustment of inertial navigation systems. The following elements of inertial systems are described: gyroscopes, accelerometers, moment-data and angle-data transmitters, and computers. The "state of the art" and prospects in the production of these instruments are reviewed. There are no references.

~~Card 1/4~~

YEVSEYEV, Sergey Vasil'yevich; SHUL'MAN, I.F., red.; LIBERMAN, T.R.,  
tekhn. red.  
[Earthquakes in the Ukraine; a catalog of earthquakes in the  
Ukraine from the year 1000 through 1940] Zemletriaseniia Ukrainy;  
katalog zemletriasenii Ukrainy s 1000 po 1940 gg. Kiev, Izd-vo  
Akad.nauk USSR, 1961. 74 p. (MIRA 15:1)  
(Ukraine--Earthquakes)

SHUL'MAN, I. L.

Journal of the American  
Ceramic Society  
Vol. 37 No. 5  
May 1, 1954  
Production Equipment and  
Unit Operations

3  
② *matte*  
Controlling the operation of electric motors of a rotary kiln.  
S. LANIN AND I. L. SHUL'MAN. *Tsement*, 19 [5] 8-15 (1953).  
Relay mechanisms for controlling the operation of electric motors  
serving a 150-m. rotary cement kiln are described and illustrated.  
The system proved dependable in new cement works in the Urals  
and in Lithuania. B.Z.K.

MF  
9-9-54

SHUL'MAN, I.M.

Buildings are going up in Leningrad. Biul.tekh.inform. 3 no.5:28-30  
'57. (MIRA 10:10)

(Leningrad--Building)

BLEKIS, V.K., inzh.; KAGAN, I.L., inzh.; CHUBUKOV, A.A., inzh.; SHUL'MAN,  
I.Ye., inzh.; CHERNYSHEV, A.K., inzh.

Portable OSN-IM equipment for welding in carbon dioxide.  
Svar. proizv. no.5:29-30 My '64. (MIRA 18:11)

1. Nauchno-issledovatel'skiy institut tekhnologii mashinostroyeniya,  
Rostov-na-Donu.

SHUL'MAN, I.Ye.; KAGAN, I.L.; CHUBUKOV, A.A.; SHAPIRO, A.A.; KURDYUMOV, G.M.

Automatic electric machine for briquetting cast iron chips.  
Mashinostroitel' no.2:5-6 F '65. (MIRA 18:3)

SHUL'MAN, Kh.Kh., inzh.

Grinding on fixed supports. Vest. mashinostr. 44 no. 10:67-69  
0 '64. (MIRA 17:11)

SHUL'MAN, Kh.Kh.

Lateral feeds for internal grinding. Stan. i instr. 32 no.4:27-29  
Ap '61. (MIRA 14:3)

(Grinding and polishing)

SHUL'MAN, Kh.Kh.

Grinding on immovable sockets. Mashinostroitel' no.8:17-18 Ag '64.  
(MIRA 17:10)

SHUL'MAN, Kh.Kh.

Grinding external surfaces and faces on fixed supports.  
Mashinostroitel' no.2:29-32 F '65. (MIRA 18:3)

SHUL'MAN, Kh.M., mladshiy nauchnyy sotrudnik

Some problems in the clinical aspects and surgical treatment of posterior hernias of the intervertebral disks with the ~~syndrom~~ of compression of the cauda equina roots. Ortop., travm. i protez. (MIRA 14:10)  
no. 9:20-24 '61.

1. Iz neyrokhirurgicheskogo otdeleniya (rukovod. -- kand.med.nauk G.S. Knirik) Kazanskogo nauchno-issledovatel'skogo instituta travmatologii i ortopedii (dir. -- kand.med.nauk U.Ya. Bogdanovich).  
(INTERVERTEBRAL DISK--WOUNDS AND INJURIES)  
(NERVES, SPINAL)

SHUL'MAN, Kh.M., mladshiy nauchnyy sotrudnik

Surgical treatment of traumatic epilepsy. Kaz.med.zhur. no.5:  
59-61 S-0 '62. (MIRA 16:4)

1. Kazanskiy nauchno-issledovatel'skiy institut travmatologii  
i ortopedii. (EPILEPSY)

E 39676-65

ACCESSION NR: AP5009194

8/0241/65/010/003/0016/0020

8  
B

AUTHOR: Shul'man, K. M.; Shitikova, M. G.

TITLE: Effects of extracorporeal circulation on the duration of the life of Cr sup 51 tagged erythrocytes (on the mechanism governing the development of post-perfusion anemia)

SOURCE: Meditsinskaya radiologiya, v. 10, no. 3, 1965, 16-20

TOPIC TAGS: extracorporeal circulation, erythrocyte, tagged erythrocyte, open heart surgery, perfusion, anemia, postperfusion anemia

ABSTRACT: Following open heart surgery involving the use of extracorporeal circulation apparatus anemia is often seen to develop in the patients concerned, which according to the authors' observations was noted in 61 out of a total of 92 cases (in 66 percent). To uncover causes leading to the development of anemia by the use of Cr<sup>51</sup>-tagged erythrocytes, studies were made into the effects produced by extracorporeal circulation and its duration on the erythrocytes' survival. All in all, 23 cases were examined. The survival of their own erythrocytes was verified in 6 patients, those of donors in 9 others and of the "pooled" blood erythrocytes in yet another 8 patients. Observations over the survival rate of erythro-

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ACCESSION NR: AP5009194

cytes were continued until T 1/2 of their life-span had been determined. The greatest changes were found to occur during extracorporeal circulation in erythrocytes of the donors' blood, the T 1/2 of their life-span being curtailed down to 16 days. There is but an insignificant reduction in the T 1/2 life of the patients' own erythrocytes, which approaches the lower limit of the normal level (24 1/2 days). T 1/2 life of the "pooled" blood erythrocytes showed a moderate deviation from the normal, giving an average of 19 1/2 days. In addition of this, evidence has been gained demonstrating a reduced viability of erythrocytes to an increase in the period of extracorporeal circulation. The available data suggest one of the causes of the development of post-perfusion anemia to be shortening of the erythrocytes life-span, chiefly, of the donors' blood. Orig. art. has: 2 tables and 2 figures.

ASSOCIATION: Laboratoriya iskusstvennogo krovoobrashcheniya Nauchno-issledovatel'skogo instituta klinicheskoy i eksperimental'noy khirurgii Ministerstva zdoravookhraneniya RSFSR (Extracorporeal Circulation Laboratory, Scientific Research Institute of Clinical and Experimental Surgery, Ministry of Public Health RSFSR); Radiologicheskoye otdeleniye Tsentral'nogo ordena Lenina instituta gematologii i perelivaniya krovi, Moscow (Radiological Institute, Central Order of Lenin Institute of Hematology and Blood Transfusion)

Card 2/3

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ACCESSION NR: AP5009194

SUBMITTED: 08 May 64

ENCL: 00

SUB CODE: 15

NO REF SOV: 006

OTHER: 010

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Card 3/3

SHUL'MAN, K.M.; AKSEL'ROD, I.I.; NIKOLAYEVA, E.P.; SHITIKOVA, M.G.

Study of hemolytic processes and the mechanism of the development of postperfusion anemia following an operation under conditions of artificial circulation with the aid of Cr<sup>51</sup>.

(MIRA 19:1)

1. Nauchno-issledovatel'skiy institut klinicheskoy i eksperimental'noy khirurgii (direktor - deystvitel'nyy chlen AMN SSSR prof. B.V. Petrovskiy) i radiologicheskoye otdeleniye (zav. - doktor med. nauk F.E. Faynshteyn) TSentral'nogo ordena Lenina instituta perelivaniya krovi. Submitted December 19, 1964.

51-1-4/18

AUTHORS: Deygen, M. F. and Shul'man, L. A.

TITLE: On a Theory of Electron-spin Resonance of F-Centres in Ionic Crystals (Continuous Model of a F-Centre - "Smoothed Functions"). (K teorii spin-elektronnogo rezonansa na F-tsentrah v ionnykh kristallakh (Kontinual'naya model' F-tsentra - "sglazhennyye funktsii").

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.1, pp.21-28. (USSR)

ABSTRACT: A mathematical paper. It discusses in relativistic (Darwin's method) and non-relativistic (Pauli's method) approximations the interaction of a localized s-electron with the nuclear magnetic moment, displaced from the centre of symmetry of the electron wave-function. Hyperfine structure of the energy levels of the electron is obtained. Calculation is generalized to the case of interaction with several nuclear magnetic moments. The results obtained are used to discuss spin-resonance, absorption of radiowaves by F-centres using "smoothed" wave-functions of the electron and to estimate the

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51-1-4/18  
On a Theory of Electron-spin Resonance of F-Centres in Ionic Crystals.  
maximum width of the absorption band. There are 12  
references, 3 of which are Slavic.

ASSOCIATION: Institute of Physics of the Academy of Sciences of  
the Ukrainian SSR, Kiyev; (Institut fiziki AN USSR,  
Kiyev.) Tadzhik State University, Stalinabad.  
(Tadzhikskiy gosudarstvennyy universitet, Stalinabad).

SUBMITTED: December 28, 1956.

AVAILABLE:

Card 2/2

SHUL'MAN, L.A.

Reflection of electromagnetic waves by a semi-infinite laminar-periodic structure. Uch. zap. Tadzh. un. 10:103-109 '57. (MIRA 10:11)  
(Electric waves)

SHUL'MAN, L.A.

~~Specifying the definitions of normal and abnormal dispersions of~~  
waves. Uch. zap. Tadsh. un. 10:110-113 '57. (MIRA 10:11)  
(Wave motion, Theory of) (Dispersion)

SHUL'MAN, L.A.; DEYNKER, N.Yu. [Deinker, N.IU.]

Model of a quantum harmonic oscillator with friction relative to the  
dispersion theory [with summary in English]. Ukr.fiz.zhur. 3 no.4:455-459  
Jl-Ag '58. (MIRA 11:12)

1. Tadzhikskiy gosudarstvennyy universitet im. V.I. Lenina.  
(Oscillations)

AUTHOR: Shul'man, L.A. 51-4-5-20/29

TITLE: Electron-Spin Resonance of F-centres in Alkali-Halide Crystals  
(Considering the Second Coordination Sphere) (Spin-elektronnyy  
rezonans na F-tsentrakh v shchelochno-galoidnykh kristallakh  
(uchet vtoroy koordinatsionnoy sfery))

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 5, pp 684-687 (USSR)

ABSTRACT: Previous work on paramagnetic absorption of radiowaves by  
F-centres took into account interaction of a localized electron  
with six nearest metal ions. The effect of further coordination  
spheres was neglected (Refs 1-3). The present paper reports  
calculation of the paramagnetic absorption line-width for the case  
of interaction of a localized electron with magnetic moments of  
nuclei both of the first and the second coordination spheres.  
Numerical results are obtained for KCl and NaCl crystals. For  
KCl, where the criteria of application of the macroscopic

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Electron-Spin Resonance of F-centres in Alkali-Halide Crystals (Considering  
the Second Coordination Sphere) 51-4-5-20/29

approximation are better satisfied than in NaCl, the relative contribution of the Cl ions to the absorption line-width is found to agree with the experimental results on distribution of the electron density near the appropriate nuclei (Ref 1). The author thanks M.F. Deygen who directed this work. There are 6 references, 5 of which are Soviet and 1 American.

ASSOCIATION: Tadzhikskiy gosudarstvennyy universitet im. V.I. Lenina  
5. Stalinabad (Tadzhik State University imeni V.I. Lenin,  
Stalinabad)

SUBMITTED: September 30, 1957

1. Alkali halide crystals - Absorption lines
2. Alkali  
halide crystals - Electron density

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84103

S/058/60/000/006/020/040  
A005/A001

246210

Translation from: Referativnyy zhurnal, Fizika, 1960, No. 6, p. 215, # 14431

AUTHOR: Shul'man, L.A.

TITLE: The Problem of the Hyperfine Interaction of the S-Electron With  
the Magnetic Moment of the Displaced Nucleus

PERIODICAL: Uch. zap. Tadzh. un-t, 1958, Vol. 18, pp. 73-87

TEXT: The spectrum of the hyperfine nucleus structure was calculated  
(spin  $\frac{1}{2}$ , 1, or  $\frac{3}{2}$ ), for a nucleus displaced by a certain distance relative to  
the symmetry center of the S-electron wave function. The problem is solved first  
for the case when the statical magnetic field is  $H = 0$ , and the interaction of the  
nucleus with the electron is considered as a small perturbation. It is shown that  
the energy corrections, calculated to a relativistic approximation and to the  
Pauli approximation, coincide. Moreover, the case  $H = 0$  is considered in the  
Pauli approximation. Hereat, it is assumed that: 1) the splitting in the normal  
Zeeman effect is considerably less than the splitting caused by the spin-orbit

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S/058/60/000/006/020/040  
A005/A001

The Problem of the Hyperfine Interaction of the S-Electron With the Magnetic Moment of the Displaced Nucleus

interaction; 2) the normal Zeeman effect is considerably greater than the distance between the levels of the hyperfine structure. The case is also considered, when the restriction 2) does not take place.

U.Kh. Kopvillem

Translator's note: This is the full translation of the original Russian abstract.

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